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FARMERS' BULLETIN 519.

AN EXAMPLE OF INTENSIVE FARM- ING IN THE COTTON BELT.

BY

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., October 2, 1912.

SIR: I have the honor to transmit herewith and to recommend for publication as a Farmers' Bulletin a paper entitled "An Example of Intensive Farming in the Cotton Belt," by Mr. M. A. Crosby, Agriculturist, Office of Farm Management of this Bureau.

This paper is descriptive of the improvement of an area of poor land by growing ordinary field crops under a system of farm management which aims at the incorporation of liberal amounts of organic matter in the soil as the chief factor in maintaining fertility and increased crop yields—a practice which can not be too frequently brought to the attention of farmers. This system has produced greater returns to the farmer who practices it than any other system in use in his locality and will serve as an object lesson to many small farmers in all parts of the country.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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AN EXAMPLE OF INTENSIVE FARMING IN THE COTTON BELT.

INTRODUCTION.

Farmers generally recognize the value of organic matter in the soil. It is rare, though, to find a man who utilizes this means of increasing crop yields to as great an extent as he profitably might. Most run-down farms of the country, particularly in the South, are in far greater need of organic matter to make them productive than they are of commercial fertilizers. In the South many means of adding organic matter to the soil are neglected. Weeds, cornstalks, cotton stalks, straw, stubble, and other trash are generally burned before the land is plowed. This is a fundamental error. They should be plowed under or worked into the soil, and in addition to this certain crops should be planted for the express purpose of green manuring. By this means alone, yields on poor land may frequently be trebled or quadrupled.

Several bulletins have already been issued by the Department of Agriculture showing the different methods of maintaining crop yields.¹ The present bulletin gives the results of a study of the system followed on a one-horse farm by an Alabama farmer who practiced intensive farming with field crops and increased the producing capacity of his soil more than tenfold, principally by making it rich in organic matter, without the extensive use of either manure or commercial fertilizer. The results obtained would not be so surprising had they been secured in trucking or some other highly specialized kind of farming.

When a man who is located in a section where much of the land has been abandoned by the so-called better class of farmers is able to make a comfortable living from only 2 acres of the ordinary field crops of the South and a small garden with the use of but little manure and practically no commercial fertilizer, the methods by

¹ Farmers' Bulletin 242, entitled "An Example of Model Farming," describes the system practiced on a 15-acre farm in Pennsylvania, where manure was the prime factor in maintaining and increasing productiveness. Farmers' Bulletin 364, entitled "A Profitable Cotton Farm," gives the history of a southern cotton farm, where both manure and commercial fertilizers were used to increase crop production.

which this is done ought to be of value to every farmer interested in increasing the crop-producing capacity of his land. This has been accomplished by the man whose home is shown in figure 1. While the methods practiced on this farm are not all such that they could be adopted on the larger farms of the South, the principle involved is fundamental and applicable to agriculture in practically all humid regions, both north and south.

THE CONDITION OF THE FARM IN THE BEGINNING.

Sam McCall, the owner of this farm, is an ex-slave, now over 75 years of age. At the time of gaining his freedom he decided to remain as a tenant on the plantation of his former owner. Being



FIG. 1.—The cabin home of Sam McCall.

thrifty, a hard worker, and a good manager, he saved what he earned and was soon able to make a payment on 40 acres of land and to start farming for himself. Later, he added to this purchase until he owned 163 acres. This land was so grown up with brush and so cut up with gullies that only a comparatively small portion of it was suitable for cultivation, and even the tillable areas, having been cropped by tenants for several years with no attempt to maintain the fertility, were very deficient in organic matter, and consequently of low crop-producing capacity. Figure 2 shows the land adjoining McCall's, which is now in the condition his was in when he took it.

McCall began working such portions of his land as were tillable, and grew cotton and corn, the crops common to that section. After

working along this line for 15 years he arrived at the conclusion that a man with a limited equipment, who was doing practically all his own work, could obtain better results by concentrating his efforts on a smaller area of land. He accordingly selected 2 acres of land near his cabin, and for the last 21 years has devoted his time and energies to increasing the producing capacity of this small area. These 2 acres were in a little higher state of fertility than the other tillable portion of his land, producing on an average from one-third to two-fifths of a bale of cotton to the acre under favorable conditions.



FIG. 2.—A field of cotton adjoining McCall's 2-acre farm.

THE SOIL AND ITS IMPROVEMENT.

The soil of the McCall farm is a grayish loam with a reddish clay subsoil. It was originally a fertile soil, but one which was rapidly depleted under poor management, owing to the fact that the land is rolling in contour, and very susceptible to erosion.

Improvement of this land was begun by increasing the organic content of the soil. At first this was accomplished by plowing under leaves and other decaying vegetable matter secured from the near-by woodland, but this practice was later discontinued. Cornstalks, cotton stalks, and all weeds from the fence corners were plowed under, but never burned, as is a common practice in many portions of the South. Practically everything but the lint cotton and a portion of the seed was returned to the land in some form or other.

The manure produced by his horse and two cows was carefully kept, but as the latter were out at pasture the greater part of the year the quantity thus saved was not large. Ditches were also constructed from the stable lot, so that when it rained any leaching from the barnyard would be carried to the field, where it could be utilized by the growing crops. No commercial fertilizer of any kind has been used, except a little cottonseed meal under the oats. The depth of the soil was made greater by gradually breaking the land deeper each year, so that now it is open, porous, and friable to a depth of 10 or 12 inches.

With the increased organic content and greater depth of soil came a corresponding increase in the yields of cotton, so that after a few years the land was producing a bale or more to the acre. By 1898 the soil had become so rich that 7 bales were produced on the 2 acres, and for several years the yield averaged close to this mark. When it is remembered that the average yield of cotton in the South is but little more than one-third of a bale per acre, these yields on the 2 acres are seen to be fully ten times as much as the average.

Noting that certain plants produced much more cotton than others, McCall was led to take up plant selection at an early date and for a number of years has saved the seed from only the best plants for planting purposes, in this way developing a high-yielding strain, which is locally known as the Sam McCall cotton. Some of these plants are shown in figure 3.

As McCall's reputation as a producer of big yields has grown, he has had no difficulty in selling his surplus cotton seed at fancy prices to the farmers of that section.

Observations made in this work soon taught this farmer that some of the better plants were each producing a pound or more of lint, and from this he concluded that with a perfect stand of plants of this high-yielding capacity it would be possible to produce nine 500-pound bales on 1 acre. This then became the goal at which he aimed, and he has been striving to attain it ever since. While he has not yet been able to produce this quantity, he has succeeded in growing a 506-pound bale on a measured one-eighth acre. This one-eighth acre plat contained 612 plants, practically a perfect stand, and the plants each produced on an average a fraction over $13\frac{1}{2}$ ounces of lint.

THE CROP-ROTATION SYSTEM.

During the last few years, having heard something of the advantages of crop rotation as a means of increasing yields, McCall has been diversifying his crops and growing corn and oats in addition to cotton, hoping in this way to still further increase the productiveness of his land, so as to enable him to produce the desired 9 bales of cotton to the acre. He first tried various rotations, growing winter

oats and following these with corn and cotton the same year, but while splendid yields of all three crops were secured, the late planting of cotton necessitated by this system correspondingly decreased its yield.

One year the entire 2 acres were planted to corn, raising two crops on the same land and producing a total yield of 320 bushels. The first crop was planted in rows 3 feet apart on March 1. On May 5 the second crop was planted between the rows of the first planting. This necessitated working the crop by hand from the time the second planting was made until the first planting was harvested. As soon as the first crop was mature, which was about June 15, the ears



FIG. 3.—Cotton plants on the McCall farm, averaging over 5 feet high.

were snapped and the stalks removed, so as to give room for the development of the second planting.

During the last four or five years a rotation of oats, corn, and cotton has been generally adhered to. The oats are sown in September in broad rows 5 to 6 feet apart. Sometimes cottonseed meal is used as a fertilizer for oats, applying it in the drill when planting at the rate of 200 pounds to the acre. At the same time cowpeas are also sown between the rows of oats. These cowpeas make considerable growth before freezing weather and thus add to the organic content of the soil. During the latter part of February the oats receive a cultivation, and about March 1 corn is planted between the rows of oats. (See fig. 4.)

The oats are harvested the latter part of May, and the stubble is immediately plowed under and the land planted to cotton. In late years, after the removal of the oats, this system has been varied by planting the cotton in the same row with the corn instead of between the rows. (See fig. 5.) This permits the earlier planting of the cotton and makes the cultivation of the crop less difficult. When the ears are about mature, the corn is topped, so as to save the top portion of the stalks for forage, and as soon as the ears are dry they are gathered and the remainder of the stalks is cut or pulled up and worked into the land between the rows, where they decay and add their quota to the organic content of the soil. (See fig. 6.)



FIG. 4.—A field of oats and corn, showing the method followed of growing oats in rows and planting corn between the rows. When the oats are harvested this stubble is left high, so as to return as much vegetable matter to the soil as possible.

When the cotton was planted between the rows of corn, cowpeas were planted between the hills of the latter crop. Now that the system has been changed and the cotton is planted in the same row with and between the hills of corn, cowpeas are planted in all the "skips" or places where hills of corn or cotton are missing. In this way every foot of available land is utilized to produce something which will ultimately be returned to the soil.

Frequent and shallow cultivation is practiced. No special tools are used; just the ordinary one-horse implements common to the section. The usual practice of planting corn and cotton on a rather high bed is not followed, and the land is cultivated almost flat.

The year 1908 was, perhaps, the banner year for yields under McCall's rotation system. That year he had 1 acre in oats, which was followed by cotton, the latter being planted in April. Over 75 bushels of oats were harvested from this acre in May. The cotton was well fruited and produced 3 bales weighing 505, 506, and 510 pounds. (See fig. 7.) From the other acre 50 bushels of oats, 50 bushels of corn, and a bale of cotton were obtained.

The following year, 1909, was one of unusual rainfall in that section, and this fact coupled with a spell of sickness kept McCall from giving personal attention to his crops at all times. His cotton yields consequently fell far below those usually secured. One-half



FIG. 5.—A field of corn and cotton, showing young cotton plants in the corn rows. The corn planted early in March is about ready to harvest, and as soon as the ears have been snapped the stalks will be cut and worked into the soil between the cotton rows. A crop of oats has already been removed from this field.

of an acre was in oats followed by cotton, and it produced 50 bushels of the former and a bale of the latter. The remaining $1\frac{1}{2}$ acres were in oats, corn, and cotton and produced 75 bushels of oats, 105 bushels of corn, and $1\frac{1}{2}$ bales of cotton.

THE FARM INCOME.

The gross annual income from this 2-acre farm has probably been between \$200 and \$350 for the last 15 years. This may appear to be a small income for one man, but it is far above that obtained by the average tenant farmer who cultivates from ten to twenty times as much land in the same crops. In 1898, the first year that 7 bales of cotton were produced, the price of the staple ranged from $4\frac{3}{4}$ to

6 $\frac{1}{16}$ cents and the gross income from lint and seed was probably about \$200.

Relative to the accuracy of the data here presented it may be stated that no books are kept by the owner of this farm, but, being possessed of an active mind and a remarkably keen memory for facts and figures, he unhesitatingly gave exact weights of bales of cotton and yields of corn produced several years back. To test the correctness of these figures a number of visits extending over a period of two years were made to his farm and on every occasion the

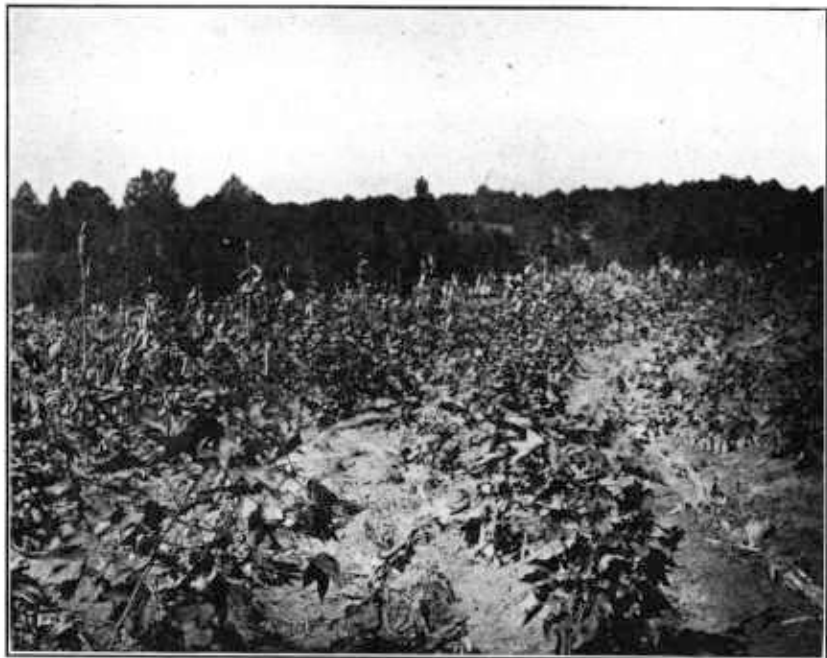


FIG. 6.—A field of corn and cotton, showing the method followed of removing the cornstalks and working these into the ground between the rows of growing cotton. In the background can be seen the cornstalks still standing in the cotton rows.

statements as to yields and other records for the different years corresponded exactly with those given on the first visit.

CONCLUSION.

The noteworthy fact in this account is that productiveness as measured by cotton was increased from one-third of a bale to 3 bales or more to the acre by the simple processes of seed selection and the addition of organic matter to the soil.

While some of the methods employed on this small farm would not be practicable on farms of a greater area, the principle involved is applicable in a general way to practically every farm in the

Southern States and is fundamental to permanent agriculture everywhere. The greatest need of nearly all southern soils is more organic matter, and this fact was recognized by McCall when he began work on his 2 acres. On farms of more extensive area it would not be possible, even were it practicable, to secure decayed leaves and other vegetable matter in large quantities for plowing under, as was done in the earlier part of the development of this farm, but the same results can be attained by other means. In the Southern States this can be accomplished by growing winter cover crops, such as crimson clover, bur clover, and hairy vetch,



FIG. 7.—An acre field of cotton on McCall's farm, yielding 3 bales, weighing 505, 506, and 510 pounds. This crop was grown after oats yielding over 75 bushels to the acre. The cotton was planted early in May between the rows of oats. Compare this view with that of the adjoining land shown in figure 2.

either alone or with winter cereals. Many of the other features, however, such as saving and utilizing all the animal manure produced on the farm, plowing under rather than burning all the corn and cotton stalks, weeds, and other vegetable matter, and increasing the depth of soil, can be put in practice on any farm.

The introduction of some such winter legume as hairy vetch, bur clover, or crimson clover with the oats would no doubt have helped to increase the organic content of the soil and to hasten the building-up process, but, even without these, results have been secured which may be ranked as exceptionally good on even our best farms, where fertilizers, manures, and legumes are all used.